INTRODUCTION
The information provided in this document pertains to the Argyle™ umbilical vessel catheters (UVCs) including single, double and triple lumen. Umbilical artery catheters are placed in infants requiring frequent arterial blood gas sampling, continuous monitoring or arterial blood pressure, and infusion of parenteral fluids. Umbilical venous catheters are placed in infants requiring exchange transfusions, central venous pressure monitoring, emergency administration of fluids or medications in delivery room resuscitation.

When selecting whether to use a single or multi lumen UVC, it is best to use the least number of lumens required to meet the goals of infusion and the needs of the neonate. Each additional lumen potentially provides another potential port of entry for a pathogen to cause a Catheter Related Blood Stream Infection (CRBSI).

CATHETER SIZE
There are two (2) arteries and one (1) vein. The arteries are small, thick walled and constricted. The vein is larger, thin walled and usually wide open.

- **Umbilical artery catheter:** neonates weighing >1250 gms, 3.5 Fr or 5 Fr catheter; neonates weighing <1250 gms, 2.5 Fr or 3.5 Fr catheter. Length of catheter to insert: measure the distance from the suprasternal notch to left superior ileac spine. A formula: (birthweight (kg) x 3) + 9 can also be used to calculate catheter length.

- **Umbilical vein catheter:** 5 Fr catheters are normally used; extremely very low birthweight neonates may need a 3.5 Fr catheter. Length of catheter to insert: measure the distance from the umbilicus to the sternal notch and multiply by 0.6.

CATHETER SITE DISINFECTION
- Accessing the umbilical stump requires sterile technique with full barrier protection: sterile cap, mask, gown and gloves. Sterile technique and Standard Precautions should be observed throughout the procedure.

- Please follow your institutional policy regarding skin preparation prior to catheter insertion.

- Cleanse the umbilical clamp, stump and a wide area of surrounding abdominal skin with an antiseptic before catheter insertion. Avoid tincture of iodine because of the potential effect on the neonatal thyroid. Avoid the use or isopropyl alcohol for initial skin preparation or for removing Chlorhexidine gluconate (CHG) of Povidone Iodine (PI).

- Isopropyl alcohol or products containing isopropyl alcohol are not recommended for neonates. However, if these agents are used; allow to dry at the insertion site completely before initiating the insertion.

- The Centers for Disease Control (CDC) can make no recommendation for the use of CHG in infants less than 2 months of age.

- Association of Women’s Health Obstetric and Neonatal Nurses (AWHONN) Neonatal Skin Care Guidelines state that either CHG or PI can be used for skin antisepsis. They recommend the following method for application of these two antiseptic solutions:
  - If using CHG, apply for at least 30 seconds or with two consecutive wipings and remove with sterile water or saline after the procedure is completed.
If using PI, apply for at least 30 seconds or with two consecutive wipings and remove with sterile water or saline after the procedure is completed.

Do not use topical antibiotic ointment or creams on umbilical catheter insertion sites because of the potential to promote fungal infections and antimicrobial resistance.

**CATHETER PLACEMENT**

- **Umbilical artery catheter** optimal placement is below the renal arteries and above the aortic bifurcation (L3 to L4) for a low catheter and below the left subclavian artery and above the diaphragm (T7 to T9) for a high catheter. The use of high umbilical artery catheters is preferred because ischemia is significantly less frequent and duration of catheter use is prolonged with high catheter position.

- **Umbilical vein catheter** should lie in the inferior vena cava with the catheter above the diaphragm but below the right atrium of the heart.

- Catheter tip location must be radiologically confirmed before infusion of any fluids through the catheter and documented in the patient’s permanent medical record.

**CARE AND MAINTENANCE**

The manufacturer’s directions for use are the best source of information regarding specific utilization of individual catheter brands. These recommendations have been developed with information based on historical data. While it is always important to adhere to institutional policies, these policies should reflect the recommendations of the manufacturer regarding care and maintenance issues.

**WARNING:** Do not use alcohol or acetone based skin protectants, adhesives or solutions on the Argyle™ UVCs.

**WARNING:** If an alcohol containing product is used on the umbilical area prior to insertion, it must dry completely before the UVC is placed in the vessel.

**WARNING:** Fluid infused through a UVC should be administered using an Electronic Infusion Device (EID) that is accurate, has anti-free flow protection, alarms and lock out protection to prevent tampering. EID occlusion sensitivity should not be set greater than 25 psi.

**WARNING:** Do not use hemostats or sharp instruments on or near the catheter.

**WARNING:** Do not bend or pinch the catheter back to temporarily occlude the catheter during tubing changes.

**WARNING:** Do not use syringes smaller than 5cc in size to flush the UVC.

**CATHETER SITE CARE**

- Replace IV tubing and add-on devices no more frequently than at 72 hour intervals. IV tubing used to administer blood products or lipid emulsions should be replaced within 24 hours of initiating the infusion.

- A short extension tube may be connected to the UVC upon insertion and may be considered a portion of the device to facilitate aseptic technique when changing administration sets.

- All add-on devices must be “luer-locking,” to prevent dislodgment and potential contamination.

- Use strict aseptic technique when changing administration sets, including the application of antiseptic solution before accessing the device or prior to disconnection.

- Catheter site care should include sterile cleansing of the catheter skin junction and the connection of the catheter with the administration set. This should only be performed with an appropriate antiseptic solution.

- If the catheter is wiped or cleaned with an antiseptic solution; remove any excess solution and allow it to dry completely. This is especially important with products containing isopropyl alcohol to avoid the potential breakdown of the integrity of the catheter.
• CHG or PI is recommended for catheter site care and cleaning. Isopropyl alcohol or products containing isopropyl alcohol are not recommended for neonates. Any solution used should be completely wiped off with sterile water after the procedure to prevent product absorption into the skin.

**FLUSHING**
• To ensure patency of each lumen of the catheter, flushing techniques and protocols are required. Please follow your hospital policy regarding flushing of UVCs. For dual and triple lumen UVCs, each lumen should be treated separately for maintenance and flushing.

• Add low doses of heparin (0.25-1.0 u/ml) to the fluid infused through umbilical arterial catheters.

**PRIMING VOLUMES**

**Single Lumen Catheters**

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<th>CATHETER CODE #</th>
<th>PRODUCT DESCRIPTION</th>
<th>AVG PRIME VOLUME</th>
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</thead>
<tbody>
<tr>
<td>8888160325</td>
<td>2.5 Fr. 12” Single Lumen</td>
<td>0.08mL</td>
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<tr>
<td>8888160333</td>
<td>3.5 Fr. 15” Single Lumen</td>
<td>0.15mL</td>
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<tr>
<td>8888160341</td>
<td>5.0 Fr. 15” Single Lumen</td>
<td>0.33mL</td>
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**Dual Lumen Catheters**

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<th>AVG PRIME VOLUME SECONDARY</th>
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<tr>
<td>8888160531</td>
<td>3.5 Fr. 15” Dual Lumen</td>
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<td>0.16mL</td>
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<tr>
<td>8888160556</td>
<td>5.0 Fr. 15” Dual Lumen</td>
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**Triple Lumen Catheters**

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<th>AVG PRIME VOLUME SECONDARY</th>
<th>AVG PRIME VOLUME TERTIARY</th>
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<tr>
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<td>8888160663</td>
<td>8.0 Fr. 15” Triple Lumen</td>
<td>0.77mL</td>
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**SECUREMENT OF THE UVC**
• After using skin prep to protect the skin, secure the catheter by suturing it to the umbilical stump. An adhesive–type tape may also be used to secure the catheter to the umbilical stump. The most common taping method is the “goalpost” or the use of a device such as an umbilical catheter anchor (see diagram below).

“Goalpost” securement method using the umbilical catheter anchor

• A dressing over the umbilicus is unnecessary. A dressing may inhibit the inspection of the umbilicus and evaluation of the catheter.

• Keep the infant’s diaper folded below the umbilicus.
• Position the infant on their side and on their back as much as possible.

• Use appropriate means to protect the catheter from being dislodged due to the infant’s extremities coming in contact with the UVC.

• Connections should be visible at all times to ensure the integrity of each connection. Do not place linen on any of the connections. Not having a clear view of all connections could hamper the immediate detection of an accidental disconnection.

CATHETER REMOVAL/REPLACEMENT

Replacement

• Umbilical artery catheters should be removed and not reinserted if signs of Catheter Related Blood Stream Infections (CRBSI), vascular insufficiency or thrombosis are present.

• Umbilical venous catheters should be removed and not reinserted if any signs of CRBSI or thrombosis are present.

Removal

• Remove UVCs as soon as possible when no longer needed or when any visible sign of vascular insufficiency (i.e. flank, extremity or digit blanching or digit cyanosis) to the lower extremities is observed.

• Umbilical artery catheters should not be left in place more than 5 days.

• Umbilical venous catheters should be removed as soon as possible when no longer needed but can be used up to 14 days if careful aseptic technique is maintained.

REFERENCES

AWHONN Neonatal Skin Care Evidenced-Based Clinical Practice Guideline (2001); 21-23.


